Ventrifossa johnboborum, a New Grenadier from the Western Pacific (Macrouridae: Pisces)

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ABSTRACT

Ventrifossa johnboborum is described from four specimens collected in the Bismarck Sea, Philippines, and the South China Sea. The new species is closely related to *V. misakia* Jordan and Gilbert from Japan, and the two constitute the sole members of subgenus *Sokodara* Iwamoto, 1979.

INTRODUCTION

Paxton and Lavenberg (1973) reported on an anglerfish (*Diceratias bispinosus*) that apparently died from attempting to eat a prey much larger than itself. The prey was a grenadier of the genus *Ventrifossa,* which they noted "does not match the description of any species described by Gilbert and Hubbs (1920) and Parr (1946)," but they were reluctant to formally name it because of the deteriorated condition of diagnostic characters resulting from partial digestion. My particular interest in this genus of grenadiers prompted me to borrow the specimen to determine its identity. The specimen appeared to be closest to *V. misakia* (Jordan and Gilbert, 1904), a species not previously known from the vicinity of the Bismarck Sea and, in fact, reported only once from outside Japan. That single record of *V. misakia* was based on a small, poorly preserved individual from the Philippines, which Gilbert and Hubbs (1920:545) compared with the holotype and noted that "certain differences . . . render somewhat doubtful the reference of [the] specimen to *V. misakia.* The snout is longer; the barbel much longer; the distances greater between the anus and the origin of the anal fin and between the ventral base and the isthmus," than normally occurs in *V. misakia.* These characters, for the most part, appeared to distinguish not only the Philippine specimen, but also the Bismarck Sea specimen and two others I had previously examined from the South China Sea, from representatives of *V. misakia* from Japan. Based on these and other characters enumerated below, the specimens are recognised as representing a new species, and hereafter are called *Ventrifossa johnboborum*. This species and *V. misakia* can be differentiated by the characters given in the following key:

1a. Oral cavity pale. Barbel 4-8 percent of head length (HL); interorbital width 30-35 percent HL; interspace between first and second dorsal fins 40-62 percent HL; distance anus to anal origin 11-15 percent HL; Japan .... *Ventrifossa misakia*

1b. Oral cavity blackish. Barbel 11-16 percent HL; interorbital width 28-30 percent HL; interspace between first and second dorsal fins 37-41 percent HL; distance anus to anal origin about 20 percent HL; Philippines, South China Sea, Bismarck Sea .... *Ventrifossa johnboborum*

MATERIALS AND METHODS

Methods of making counts and measurements follow procedures outlined in Iwamoto (1970). Abbreviations used in reference to study material include: AMS, Australian Museum, Sydney; FRSA, Fisheries Research Station, Aberdeen, Hong Kong; USNM, United States National Museum of Natural History, Washington, D.C.

STUDY MATERIAL

Holotype. AMS No. I. 15602-002, Bismarck Sea, floating at surface near Tanga Island, Papua New Guinea, 30 Apr. 1967 [in mouth of anglerfish *Diceratias bispinosus*].

Other material. USNM 149044 (32 mm HL, 70 + mm TL); off Atalaya Pt., Batag Island, Luzon, Philippines, 12°44′42″N, 124°59′50″E, Albatross sta. 5445, (depth approximately 702 m), 3 June 1909. — FRSA, uncat., 1 specimen, 75 mm HL, 320 + mm TL, South China Sea (depth 732-796 m), cruise 1/64, sta. 26, 7 Jan. 1964 .— FRSA uncat., 1 specimen, 48 mm HL, 185 + mm TL, South China Sea, cruise 4/64, sta. 19, 5 Mar. 1965.

Specimens from the South China Sea are not included as type material because information on these is based on sketchy notes taken in 1970 during a brief visit to the Fisheries Research Station, Aberdeen, and also because a permanent disposition of the specimens could not be assured. The Luzon specimen is in poor condition and is so much smaller than the holotype that differences in morphometry (especially the snout and suborbital region) may indicate more than ontogenetic variation. Without adequate size series, these differences could not be adequately evaluated.

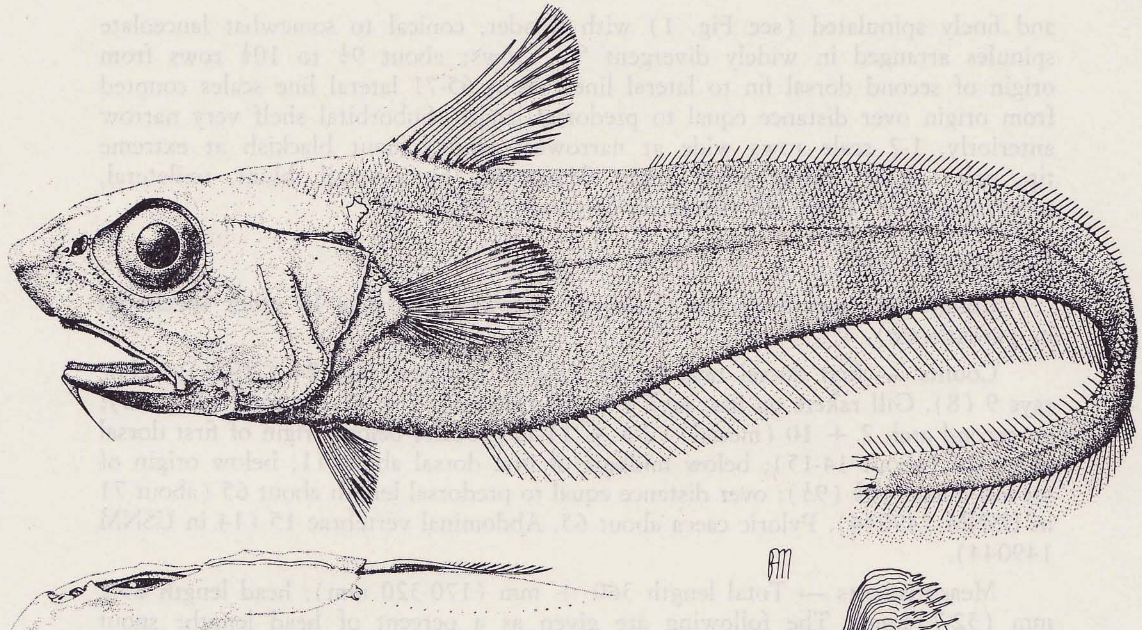

Fig. 1. *Ventrifossa johnboborum* n. sp. Holotype, AMS No. I.15602-002, from the Bismarck Sea. Lateral and dorsal views, and enlarged view of scale taken from below origin of second dorsal fin. Drawn by Beth Meinhard.

Ventrifossa johnboborum n. sp.

(Figure 1)

Ventrifossa misakia (non Jordan and Gilbert, 1904): Gilbert and Hubbs, 1920:545-546 (one specimen, Batagia I., Philippines). Roxas and Martin, 1937:63 (compiled Philippine record). Herre, 1953:1974 (compiled Philippine record).

Ventrifossa sp.: Paxton and Lavenberg, 1973:47-50, fig. 1 (one specimen in mouth of anglerfish *Diceratias bispinosus* found floating on surface, Bismarck Sea).

DIAGNOSIS

A broad-headed species of *Ventrifossa,* subgenus *Sokodara* (as defined by Iwamoto, 1979), with 8-9 pelvic fin rays. Lining of oral cavity blackish. Interorbital width 28-30 percent of HL. Barbel small, 11-16 percent HL. Scales small and finely spinulated (see Fig. 1) with slender, conical to somewhat lanceolate spinules arranged in widely divergent "V" rows; about 9½ to 10½ rows from origin of second dorsal fin to lateral line; about 65-71 lateral line scales counted from origin over distance equal to predorsal length. Suborbital shelf very narrow anteriorly, 1-2 scale rows wide at narrowest point. Snout blackish at extreme tip, paler along leading edge; snout demarcated by a small, blunt, unilateral, tubercular scale. Inner gill rakers on first arch 12-14 total.

DESCRIPTION

Counts and measurements (holotype followed by range in other specimens in parentheses).

Counts — first dorsal rays II, 11 (8-10); pectoral rays 24 (20-23); pelvic rays 9 (8). Gill rakers on first arch 9 or 10 (lateral), 1 + 11 (mesial) (2 + 12); on second arch 2 + 10 (mesial) (2-3 + 11-12). Scales below origin of first dorsal about 20 (about 14-15); below midbase of first dorsal about 11; below origin of second dorsal 10½ (9½); over distance equal to predorsal length about 65 (about 71 in USNM 149044). Pyloric caeca about 65. Abdominal vertebrae 15 (14 in USNM 149044).

Measurements — Total length 360 + mm (170-320 mm); head length 85.2 mm (32-75 mm). The following are given as a percent of head length: snout length 28 (29-31); preoral length 20 (23-25); greatest orbit diameter 31 (29-35); interorbital width 30 (28-30); postorbital length of head 41 (41-42); orbit to angle of preopercle 42 (42-45); suborbital width 12 (12-17); length upper jaw 42 (36-39); barbel length 16 (11-12); length outer gill slit 27 (14-21); preanal length 135 (136 in USNM 149044); base of outer pelvic ray to origin of anal fin 49 (36 in USNM 149044); greatest body depth 75 (76 in FRSA spec.); interspace between dorsals 41 (37); height of first dorsal fin about 60 (60-63); length pectoral fin about 446 (38-49 in FRSA spec.); length pelvic fins estimated 34 (29-41 in FRSA spec.).

Description of Holotype: (see Fig. 1)

Snout broadly pointed, moderately produced, and uniformly covered with small scales (evenly and completely covering surfaces). A small, conical, tubercular scute developed at apex of snout; scute not markedly different from surrounding scales. Dorsal profile low; nape barely rises above uppermost level of head; dorsal fin base almost flush with profile posteriorly. Suborbital shelf very narrow anteriorly, two small scales wide at narrowest point, but shelf broadens rapidly posteriorly. Gill openings wide. Branchiostegal membranes narrowly joined across isthmus at a point situated ventrad to posterior edge of orbits. Upper margin of preopercle inclined forward. Interopercle narrowly exposed along posteroventral margin of preopercle. Mouth large and broad; upper jaws extend posteriad to vertical through posterior edge of orbits. Ascending limbs of premaxillae lean forward at a notably obtuse angle (much further inclined than in any other member of the genus except *V. misakia*). Lips thin and smooth (nonpapillaceous).

Scales extremely small, approaching both in size and spinulation those found in members of the genus *Malacocephalus*. Exposed margins of scales narrow and evenly covered with slender, relatively erect spinules arranged in widely divergent "V" rows. Spinules conical to somewhat flattened and lanceolate (but spinules mostly conical in smaller paratypes). Head and body completely covered with scales except on fins, lips, gill membranes, and periproct region.

Paired fins moderately large (for genus); outer pelvic ray essentially not prolonged beyond other rays of fin. Anal fin originates far forward on abdomen, about midlength of abdominal cavity, and about on vertical through hind margin of first dorsal fin. Serrations on spinous second ray of first dorsal fin rudimentary and confined to distal end; remainder of spinous ray smooth; ray not prolonged beyond succeeding rays (serrations on leading edge of spinous ray better developed in other specimens). Pelvic fins originate well forward of vertical through pectoral fin origin, below subopercle.

Jaw teeth all small, conical, and recurved to various degrees. Mandibular teeth in 2-3 irregular series laterally, in 3-4 series near symphysis. All mandibular teeth small, but inner series larger than more lateral ones. Premaxillary dentition in narrow band 4-5 irregular rows wide near symphysis, slightly narrower posterolaterally; outer series of teeth somewhat larger than inner series. A wide gap between opposite tooth bands at symphysis of upper jaw.

Ventromedian area of abdomen badly damaged in holotype, but in other specimens a small, oval anterior dermal window of ventral light organ is present. The blunter end faced posteriorly and is narrowly connected to periproct by a thin line of black skin. An indistinct posterior dermal window within periproct, before anus. Retia and gas glands two each, retia relatively short, broad, and flat.

Holotype a female with large, well-developed ovary on right side, but none developed on left side. Stomach contains three large squid beaks and other remains of squids. Pyloric caeca about 65, difficult to count, with many tips broken off; branching of caeca confined to or near bases.

Colouration in alcohol. Brownish overall with blackish or swarthy fins, lips, and gill membranes (USNM 149044 more pallid; tawny overall). Swarthy ventrally on trunk. Bluish on abdominal areas denuded of scales. Oral, pharyngeal, and branchial membranes blackish. Gill arches blackish, but filaments pale.

COMPARISONS AND RELATIONSHIPS

In addition to the differences between *V. misakia* and *V. johnboborum* noted in the key, *V. johnboborum* shows notable differences in the configuration of the suborbital ridge. That portion of the ridge below the anterior border of the orbits in *V. misakia* runs so close to the ventral orbital rim that it almost appears to touch the rim, being separated by only a single scale row at the closest point. In *V. johnboborum,* however, the ridge line does not run as close, and there are two small scales separating the ridge line from the orbital rim. Furthermore, in the holotype of *V. johnboborum,* the second spinous dorsal ray appears to completely lack serrations on all but the distal one-quarter to one-third. In all specimens of *V. misakia* examined and in the USNM specimen of *V. johnboborum,* the ray had small, fine, but complete serrations on the leading edge.

Ventrifossa johnboborum and *V. misakia* form a closely related pair differentiated from other members of the genus by a combination of squamation features, configuration of the suborbital ridge, vertebral numbers, and retia-gas gland shapes. The two are considered to be the only members of the subgenus *Sokodara* (Iwamoto, 1979). *Ventrifossa nasuta* (Smith, 1936) from the Indian Ocean resembles *V. misakia* and *V. johnboborum* in general head and body shape, and in having a distinct terminal snout scute and a narrow suborbital shelf below the anterior part of the orbit, but *V. nasuta* has much larger, coarser scales (about 6-7 scale rows from origin of the second dorsal fin to lateral line).

DISTRIBUTION AND HABITS

Ventrifossa misakia is apparently confined to waters off Japan, whereas *V. johnboborum* ranges widely to the south of this in the Indo-Australian Archipelago. The new species was absent from the extensive trawl collections made off Australia and New Zealand by the Japanese research vessel *Kaiyo Maru* (Arai, *in litt.,* 1979).

Most *Ventrifossa* specimens are captured in bottom trawls, thus suggesting a primarily benthic or benthopelagic habit for the species. The presence of the holotype of *V. johnboborum* in the mouth of an anglerfish and the squid remains in the stomach of the holotype might initially suggest vertical forays into the water column by individuals of the new species. Okamura (1970:78) has, in fact, suggested vertical migrations in *V. garmani* based on hook-and-line captures of individuals off Japan, but in these hook-and-line captures, the baited hooks were set on drop lines attached to a vertical mainline, and the fish may well have "followed" the baited series of hooks vertically to the upper part of the mainline where they were caught (Okamura, pers. comm. 1971),. Of more pertinence is Paxton and Lavenberg's (1973:50) statement that all (four) known metamorphosed females of *Diceratias bispinosus* were taken with bottom-fishing gear, and "apparently *D. bispinosus,* while having no obvious morphological adaptation for benthic life, lives and feeds close to the bottom." There is thus no reason to conclude that the *D. bispinosus* individual that captured the holotype of *V. johnboborum* did so other than near the bottom.

ETYMOLOGY

The species is named for John R. Paxton and Robert J. Lavenberg who first recognized the species as new.

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